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# RADIUM

EDITED BY  
CHARLES H. VIOL, Ph. D.  
AND  
WILLIAM H. CAMERON, M. D.

VOL. X

NOVEMBER, 1917

No. 2

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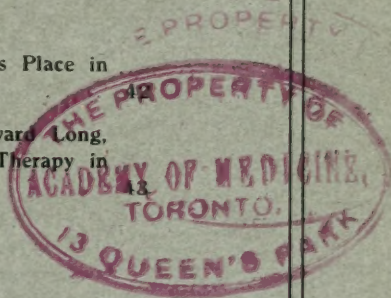
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A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY  
PHYSICS AND THERAPEUTICS OF RADIUM  
AND RADIO-ACTIVE SUBSTANCES

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# RADIUM

A MONTHLY JOURNAL DEVOTED TO THE CHEMISTRY, PHYSICS AND THERAPEUTICS OF RADIUM AND RADIO-ACTIVE SUBSTANCES.

Edited and Published by Charles H. Viol, Ph. D., and William H. Cameron, M. D.  
with the assistance of collaborators working in the fields of  
Radiochemistry, Radioactivity and Radiumtherapy.

Subscription \$2.50 per year, or 25 cents per copy in the United States and Canada  
in all other countries \$3.75 per year.

Address all communications to the Editors, Forbes and Meyran Avenues,  
Pittsburgh, Pa.

VOL. X

NOVEMBER, 1917

No. 2

## MORPHOLOGIC APPEARANCE OF CANCER CLINICALLY CURED BY RADIUM AND ROENTGEN RAY\*

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and

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The reports on the result of surgical treatment of cancer cases as well as the more recent reports on radium and Roentgen-ray therapy of the disease abound in expressions "radical cure," "clinical cure" and "improvement." It is appropriate, therefore, to preface the analysis of the cases presented for this study by a correct definition of these terms.

A surgical statement that a cancer case is radically cured implies that the patient is alive and free from the disease from three to five years after the operation. The probable ultimate result of a radical operation may be inferred among others from the following study of a French surgeon, Heurtaux. During a period of thirty years he operated in 341 cases of carcinoma of the breast; 284 cases could be traced for long periods of time, and of these patients, 43.3 per cent. remained well four years after the operation and should consequently be considered radically cured. Four years later, or eight years after the operation,

\* From the Department of Cancer Research of the Montefiore Hospital and Home.

Reprinted from Jour. A. M. A., LXIX, 1068-1073, Sept. 29, 1917. Read before the Section on Pathology and Physiology at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.



## RADIUM

only 16.9 per cent. remained well and free from a recurrence. Ten years after the operation only 12.32 per cent. remained well, fifteen years after the operation 8.1 per cent., and twenty years after the operation only 2.46 per cent. remained free from a recurrence. A recurrence of cancer, no matter how late after an operation, indicates that some tumor tissue was left behind somewhere in the organism at the operation. A radical operation for a malignant tumor means a complete eradication of all tumor tissue from the organism. An analysis of Heurtaux's writings, and many other similar publications, thus shows that in by far the greatest majority of cases of cancer the best surgical methods of treatment do not completely eradicate the disease and consequently do not induce a radical cure of the disease. Most frequently, then, surgery only postpones a recurrence and thus prolongs life. It is quite legitimate, nevertheless, to consider such a result a clinical cure, since the patient remains clinically well for a longer or shorter period of time, and the presence in the organism of the remnants of the malignant tumor cannot be detected by any means at our disposal. Furthermore, a clinical cure takes place, even when the malignant tumor does not entirely disappear, but loses the characteristics of its malignancy, ceases to grow and invade the surrounding tissue, behaves clinically like a benign tumor and retains these characteristics for a sufficient length of time. To recapitulate: A clinical cure of cancer means a gross destruction or diminution of the size of the primary tumor with disappearance of symptoms and a well being continued for a sufficiently long time to preclude the possibility of a spontaneous remission of the disease.

An "improvement," "palliation" or "palliative improvement" must be considered the alleviation of distressing symptoms without any inhibition of the development and growth of the malignant tumor. A tracheotomy for the relief of dyspnea in carcinoma of the larynx, gastrostomy for relief of obstruction in carcinoma of the cardia, gastro-enterostomy in carcinoma of the pylorus, and colostomy in carcinoma of the colon produce such a palliative improvement, which may be followed by increase of weight and strength and temporary well being of the patient. The action of radium and Roentgen rays in arresting hemorrhage, foul discharge and relieving pain in far advanced inoperable cancer also induces thereby a palliative improvement.

One of us<sup>1</sup> recently reported on several cases of inoperable carcinoma and sarcoma which remained clinically cured for a number of years by the aid of radium and Roentgen-ray therapy. The number of similar cases reported by other investigators is so great, and the therapeutic action of these radiations is so frequently satisfactory under correct and uniform conditions, that the specific action of the rays on malignant tumors does not require any further discussion. The fact that in the vast majority of cases of malignant tumors which undergo the radium and Roentgen-ray treatment a palliation or a clinical cure and not a radical cure is obtained does not detract anything from the value of the method.

The clinical effect of the radium and Roentgen rays on malignant tumors is accompanied in the great majority of cases by distinct morphologic changes in the tumor tissue. As a general rule, it may be stated that tissues consisting of less differentiated, younger cells, cells in a state of active proliferation, are most deeply influenced by the rays, and that consequently there is selective action of the rays on the actively proliferating tumor cells as compared with the normal



organ cells. The first morphologic changes which occur in carcinoma or sarcoma tissue under influence of radium and the Roentgen rays are observed in the tumor cells themselves, and are manifested by the vacuolation of the protoplasm, pyknosis of nuclei, karyolysis, and ultimately complete necrosis of the cell. These cellular changes are accompanied by a round cell infiltration which replaces the destroyed cancer cells. Subsequently this round cell infiltration is changed into dense sclerotic connective tissue poor in blood vessels. This connective tissue formation may become very extensive, surround islands of cancer cells, and assist in the destruction of the latter. Indeed, this new connective tissue formation is the most generally observed morphologic change in the tumor. Some observers even maintain that this connective tissue formation is the only direct effect of radiation, while the destruction of the tumor cells is secondary and is due to lack of nutrition. However, this opinion is not borne out by facts. The first morphologic change

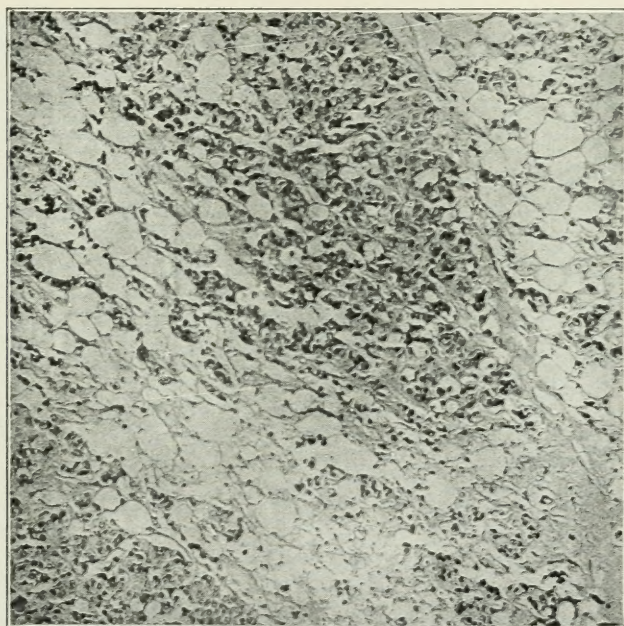


Fig. 1 (Case 1).—Scirrhus carcinoma of the breast.

noted is always the destruction of the tumor cells, and the connective tissue appears only subsequently. Moreover, in certain conditions—for instance, rodent ulcer of the skin—the epithelioma cells disappear and the ulcerated area is covered with skin epithelium without any formation of connective tissue. The assumption, on the other hand, that the formation of connective tissue is secondary to the accumulation of dead tumor cells and is analogous to formation of connective tissue around foreign bodies and particles of dead matter is also hardly tenable. Were this connective tissue formed only by the stimulus of the dead tumor cells, then the radiations would dissolve it subsequently as easily as it dissolves a keloid, for instance. However, this does not take place, and the amount of the peculiar sclerotic connective tissue usually increases with subsequent radiations.



## RADIUM

A case of carcinoma of the sigmoid with metastatic dissemination in the peritoneum previously reported by one of us<sup>1</sup> demonstrates the importance and extent of this connective tissue formation. An exploratory laparotomy was done on the patient which revealed a carcinoma of the sigmoid and a peritoneal dissemination with minute metastatic nodules. The case was declared to be inoperable and the tumor was not removed. The patient was treated with massive doses of Roentgen rays for six months; subsequently the patient died from an acute intestinal obstruction. At the necropsy there were found in the peritoneal cavity several loops of the small intestine adherent by old adhesions to the posterior surface of the tumor mass in the sigmoid. The peritoneum was studded with numerous white plaques, varying in size from 1 to 5 mm. in diameter. Microscopic examination of a section taken through two loops of the small intestine that were firmly bound together by adhesions showed that the latter consisted of a thick layer

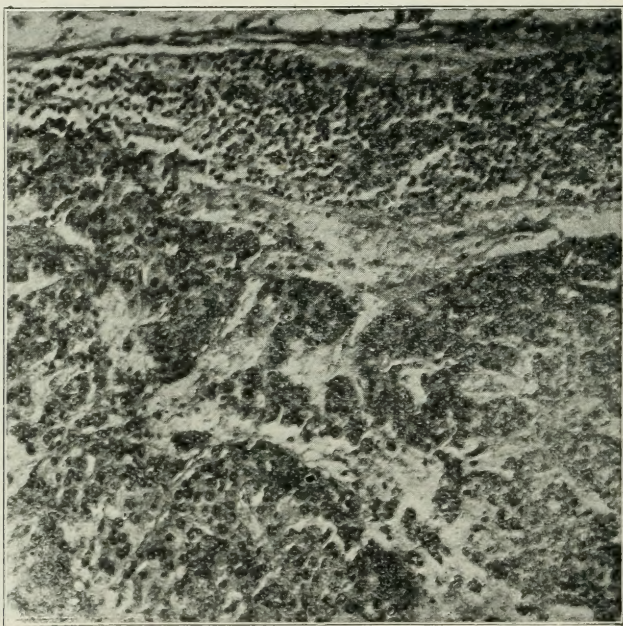


Fig. 2 (Case 1).—Metastatic carcinoma of a lymph gland.

of connective tissue containing occasional nests of tumor cells. The peritoneal nodules were composed of dense connective tissue, with occasional minute groups of tumor cells. The amount of connective tissue in these peritoneal nodules of carcinoma was entirely out of proportion to the number of carcinoma cells present. On the other hand, the peritoneal endothelium of the sections of the wall of the small intestine adjacent to the plaques was normal and showed no connective tissue formation.

The source of the new connective tissue formed under the influence of the radium and Roentgen rays must be looked for either in the stroma of the tumor or in the round cell infiltration that closely follows the destruction of the tumor cells by the radiations. It may

1. Levin, Isaac: Surg., Gynec. and Obst., 1915, 21, 374.



be stated then that while the destruction of the tumor cells is the primary phase and the formation of new sclerotic connective tissue a secondary, it is at least as important a phase in the morphologic changes which take place in malignant tumors under the influence of radium and Roentgen rays. Furthermore, the microscopic study of this case of carcinoma of the sigmoid indicates the possibility that the proliferating capacity and the consequent clinical malignancy of a tumor may be inhibited under the influence of the radiations without the presence of any apparent morphologic changes in the tumor tissue. The deeper portions of the sigmoid tumor, as well as a certain number of the peritoneal plaques, showed morphologically unchanged carcinoma cells. Nevertheless, in over six months not a single one of the minute nodules found at the operation developed into a discrete secondary tumor, and the primary sigmoid tumor did not increase in size during the time.

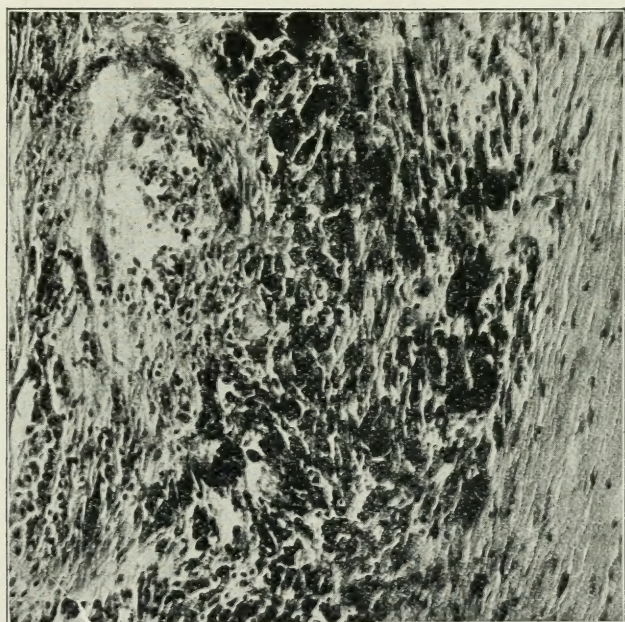


Fig. 3. (Case 2).—Melanotic cancer, primary tumor, before treatment.

The following series of cases, observed recently by us, present a similar condition of clinical cure without any apparent morphologic changes in the tumor tissue:

CASE 1.—Mrs. W. Y., aged 40, was admitted to the Montefiore Hospital in 1906 suffering from bronchial asthma and emphysema. In August, 1915, a hard mass the size of a hen's egg was discovered in the outer margin of the right breast. The skin was adherent to the tumor, and there were enlarged glands in the right axilla. A clinical diagnosis was made of carcinoma of the breast with the involvement of the axillary glands. The general condition of the patient precluded any operative interference, and she was treated by a local application of radium to the breast and axillary glands and Roentgen-rays through



the chest wall. The breast tumor and the gland at first diminished somewhat in size and then remained stationary. Seventeen months later the patient died from her pulmonary condition. A complete necropsy was performed by Dr. B. S. Kline. A minute search was made for possible metastases, but none were found anywhere in the organism. The microscopic examination of the tumor of the breast showed a scirrhus carcinoma, and the lymphatic glands of the axilla were filled with solid carcinoma. Figures 1 and 2 show that morphologically both the primary tumor and the metastases in the lymph glands appeared quite malignant and did not show any changes characteristic of radiotherapy. Nevertheless, nearly a year and a half after the condition was discovered, no dissemination or distant metastases were found anywhere in the organism.

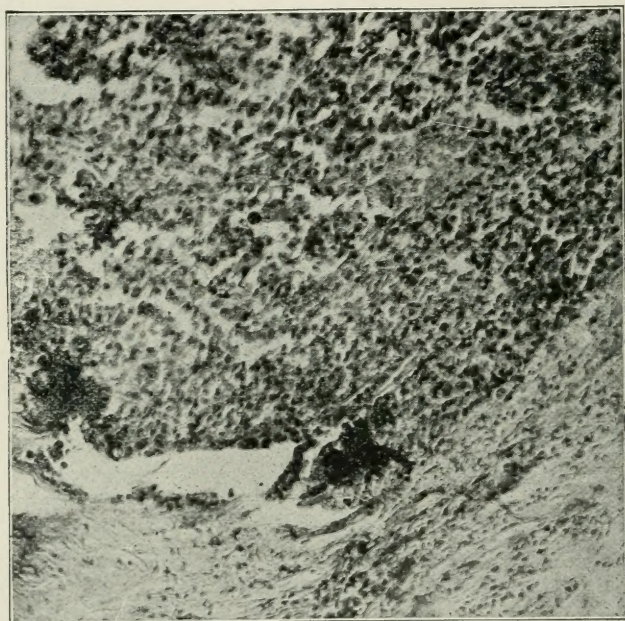


Fig. 4 (Case 2).—Melanotic cancer of the lymph gland twenty months after the beginning of the treatment.

As a rule, a patient with carcinoma of the breast with the involvement of the axillary glands, if left untreated, dies in less than a year and a half from a general dissemination of the carcinoma. It is thus quite evident that in the case reported here radium and Roentgen-ray therapy inhibited the further growth and dissemination of the carcinoma tissue and transformed it, as it were, into a biologically and clinically benign type of a tumor, though it did not change its morphologic appearance.

CASE 2.—Mrs. B. K., aged 40, developed a pedunculated tumor the size of a small orange on the skin of the right supraclavicular region. The tumor was removed in March, 1915, with the pedicle. There was left after the operation an ulcerated area 1 cm. in diameter that did not heal. The microscopic examination (Fig. 3) of the tumor showed it to be a melanotic cancer. The case was then referred to one of us



for radium and Roentgen-ray treatment. On examination there was observed the ulceration described above and an enlarged supraclavicular lymph gland about three-fourths inch long. Under the influence of the ray therapy, the ulcer healed and the gland at first diminished somewhat in size and then remained stationary. At present, two and one-half years after the beginning of the treatment, the patient is clinically perfectly well, and no metastatic tumors have developed anywhere. Melanotic cancer is an exceedingly malignant condition, and the average life of the patient is not more than two years. Coley and Hoguet,<sup>2</sup> who made an exhaustive study on the subject, state that the melanotic cancer in the cervical glands is especially malignant, causing death in a short time. In October, 1916, twenty months after the beginning of the treatment, the supraclavicular gland was excised for diagnostic purposes. The microscopic examination (Fig. 4) of the gland showed a morphologic picture identical with the one found in the primary tumor

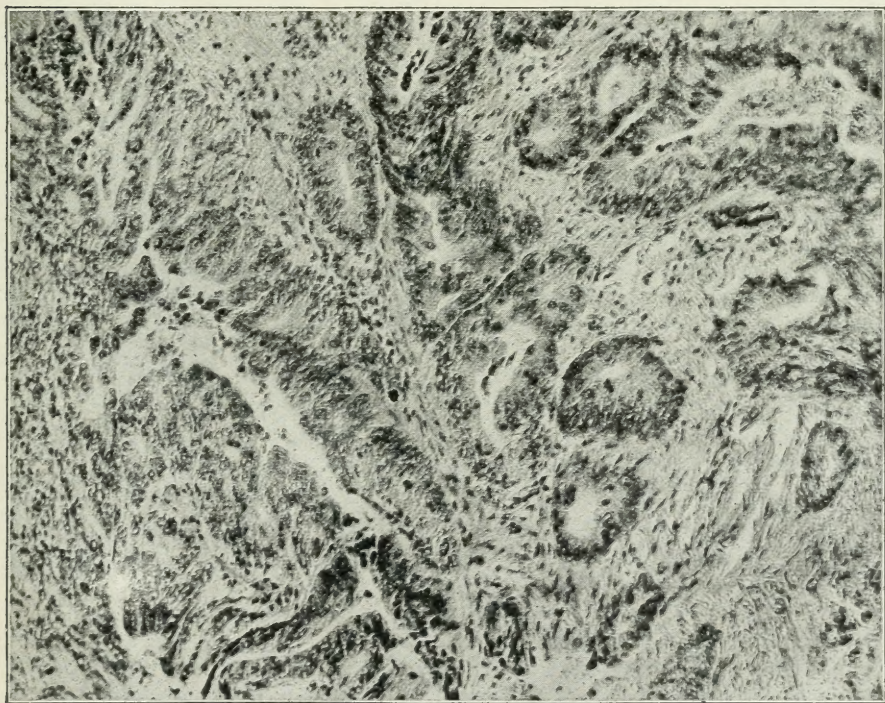


Fig. 5 (Case 3).—Adenocarcinoma of the colon, recurrent, before treatment

before the initiation of the treatment. Nevertheless, as stated above, at present, eight months after the second operation and two years and three months after the first, the patient is perfectly well and did not develop any secondary tumors anywhere. Here again the radiotherapy inhibited the proliferating power of the cancer cells and arrested the growth of the tumor without having produced any apparent morphologic change.

CASE 3.—Mr. B. G., aged 51, was operated on in December, 1915,

2. Coley, W. B., and Hoguet, J. P.: *Ann. Surg.*, 1916, 64, 206.



for adenocarcinoma of the ascending colon. The tumor was radically removed and a right colostomy performed. In February, 1916, the patient was admitted to Montefiore Hospital. On admission, no recurrence of the carcinoma was found anywhere. In July, 1916, an attempt was made to close the colostomy wound by the aid of clamps, but the operation was discontinued since a recurrence was discovered at the intestinal bridge of the colostomy opening. There was felt a hard tumor mass about a cubic inch in size. The outer surface of the tumor consisted of an ulcerated area about three-fourths inch in diameter. A small piece was excised for examination, and showed microscopically an adenocarcinoma (Fig. 5). For the last ten months the patient has been undergoing Roentgen-ray treatment. He is clinically well, the tumor did not increase in size, the ulceration appears to be partly healed, and no secondary tumors or metastases developed anywhere. Recurrences in intestinal carcinoma are generally malignant, and disseminate all over the peritoneum and kill the patient very rapidly. Recently another piece was excised for examination, and the result of the microscopic study of this specimen (Fig. 6) is very instructive. There is no direct evidence of any extensive degeneration of the cancer cells or excessive formation of new sclerotic connective tissue characteristic of radiated malignant tumors. But unlike cases 1 and 2, the two specimens of this case removed before and after treatment do show a certain morphologic difference. While the specimen taken before treatment shows a perfectly characteristic picture of adenocarcinoma in every field, the specimen obtained after treatment is not so characteristic, and a great many of the tubules resemble more a benign adenoma than an adenocarcinoma. These findings are somewhat difficult to explain. It is possible that the superficial, more malignant part of the tumor was destroyed under the influence of the rays. The partial healing of the ulcerated surface coincides with this assumption. The deeper portions were then inhibited by the Roentgen ray in their further malignant transformation. In any event, a clinical inhibition is quite evident in this case as well.

We have been unable to find in the literature and description of similar cases in which a clinical arrest of disease was accomplished by a complete absence of morphologic changes. Morson,<sup>3</sup> in his description of the various changes which occur in malignant tumors on exposure to the gamma rays of radium, states that there may take place a loss of the reproductive function of the cancer cell, but he does not illustrate this condition in any of his cases. On the other hand, there is a good deal of experimental evidence that elucidates the clinical and morphologic phenomena described in this presentation. Von Wassermann<sup>4</sup> reported in 1914 the results of his experiments on the action of radium on small pieces of mouse carcinoma in vitro. He has shown that the cells remain alive, but the pieces do not grow when they are subsequently inoculated in a healthy mouse. He concludes that the rays act directly on the cancer cells. However, they do not kill the cells, but impair the genueptors of the proliferating apparatus, and as a result inhibit the formation of new cells. The actual death of the

3. Morson, A. C.: *Brit. Jour. Surg.*, 1915, **2**, 354.

4. Von Wasserman, A.: *Deutsch. med. Wchnschr.*, 1914, **40**, 524.



cancer cell and disappearance of the tumor is produced either through the aging of the remaining cells or through the cytolytic powers of the organism. Therefore, the rays act selectively on tissues, the cells of which are rich in genueptors and proliferate rapidly. This hypothesis of von Wassermann fits in very well also with the frequently observed clinical fact that a malignant tumor may continue to diminish in size weeks after the ray treatment was discontinued. In a recent publication on the effects of radium in tissue growth in vitro, Prime<sup>5</sup> reports very similar results. He observed that radium injures the nucleus of the cells growth in animal plasma, so that it prevents further formation of mitosis. On the other hand, it does not injure the life and functions of the cell. For instance, the outwandering of the cells from the main mass of the tumor in the culture due to ameboid motion continues with

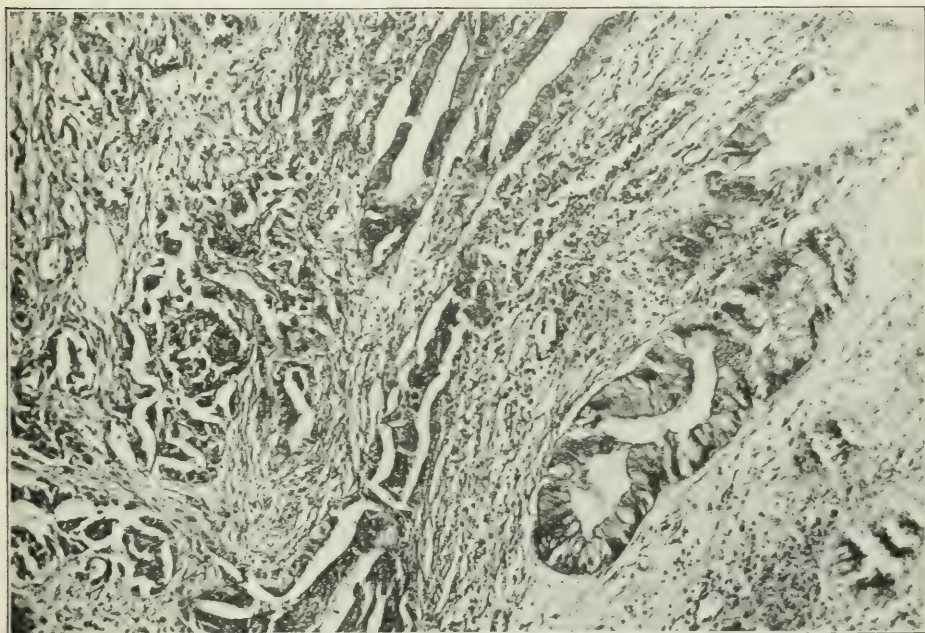


Fig. 6 (Case 3).—Adenocarcinoma of the colon after treatment.

the same rapidity as in the nonradiated control cultures. The beating of a piece of a heart muscle placed in the plasma culture continues for the same length of time in the radiated as in control cultures. Identical results were obtained by Halberstadter,<sup>6</sup> who studied the action of the radium rays on trypanosomes in vitro. The effect of the rays consisted in the inhibition of the infectivity of the parasites; that is, they lost their power to proliferate when introduced into a new host after having been radiated in vitro. On the other hand, the motility of the trypanosomes is not impaired by the action of the radium.

Thus the clinical investigations reported in this presentation as well as experimental studies show that the radium and Roentgen rays may impair deeply the proliferating power and consequently the clinical malignancy of cancer cells without producing any change in the mor-

5. Prime, Frederick: Jour. Cancer Research, 1917, 2, 107.

6. Halberstadter, L.: Berl. klin. Wchnschr., 1914, 51, 252.



## RADIUM

phologic appearance of the tumor. Indeed, it is quite probable that the first effect of the rays on every malignant tumor consists in the inhibition of the proliferating power, in the *sterilization*, as it were, of the cancer cells. The degeneration and destruction of the cancer cells and the formation of the sclerotic connective tissue takes place subsequently, under the influence of the rays. Moreover, this cell degeneration and cell death may not be due directly to the action of the rays, but takes place in the natural course of the life cycle of the cancer cell. This cycle consist of youth, or period of development; maturity, or period of function; and the senility, or period of degeneration, which gradually leads to death. In parenchymatous organs, like the liver and the kidney, the first period is usually completed during embryonic life or at very early age. The second period continues through the whole life of the organism, and the third period is attained at the old age of the organism or near its death. The life of an individual cancer cell, on the other hand, is very short. It changes rapidly from an embryonic into an adult and then immediately into an aged, degenerated cell, and this process takes place continually irrespective of any extrinsic aid. But in a malignant tumor the majority of the cancer cells are quickly rejuvenated before they reach senility through the fact that each cancer cell changes into two young daughter cells. When the rays arrest this proliferation, then the cancer cells without any further outside aid mature and degenerate. It is interesting to note in this connection that the life of the epithelium of the skin or testicle is nearly as short as the one of the malignant tumors, and the rays act on these organs as specifically as they do on malignant tumors.

The importance of this observation is twofold. In the first place, the morphologic appearance of radiated tumor tissue is not an absolute criterion of the therapeutic effect produced by the action of the rays on the tumor. Positive finding of the changes described above as characteristic of the action of the rays is an indication of a therapeutic result. Negative findings, on the other hand, do not preclude the possibility that the tumor was influenced by the rays. Radiated and nonradiated carcinoma tissues may have the same microscopic appearance, and still the former tissue is sterilized and may have lost to a great extent its power of proliferation and consequently its clinical malignancy. In fact, the same holds true for various malignant tumors without any relationship to radiotherapy. An epithelioma may present the same microscopic picture whether it belongs to a comparatively benign, slowly growing ulcerous rodens of the face or to a highly malignant epithelioma of the lip. The second point of great practical importance to be derived from this investigation is that the radium and Roentgen rays are capable in a certain number of cases of sterilizing or inhibiting the malignancy of a tumor without destroying it. It is imperative, therefore, to subject every malignant tumor to treatment by the rays, before the performance of the radical or partial operation. The same holds true of postoperative treatment. The rays may sterilize and inhibit the proliferation of the remaining cancer cells, even if they do not destroy them outright.

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### ABSTRACT OF DISCUSSION.

DR. HENRY SCHMITZ, Chicago: We must accept the dictum that the radiosensibility of cells depends on various factors. The action of



radium is direct and indirect. The direct action causes degeneration of the cells whereby mitosis ceases. The indirect action is a systematic one which, as yet, we cannot explain.

Tumors arise not by the avidity of the tumor cells, but by a decrease of the avidity of the normal body cells. If the resistance of the host declines until it reaches a point where the carcinoma cells overpower the normal cells, then growth of the tumor follows. The question is whether it is not the systematic influence of the rays, that is, the indirect action, which brings about the cessation of growth of the tumors. The direct action of the rays on the carcinoma cells varies and depends on various factors—in the first place, on the specific character of the cells—the less differentiated the cell is the more radio-sensitive will it be. It also depends on the age of the bearer of the cells. We know that the rays act very much more readily and intensely in the young than on adults. Cancers also are more malignant at this period. This behavior results from the fact that the cells of the young are more profusely nucleated; the blood supply is more abundant. In the aged, however, the nuclei become fewer and the blood vessels contract by a process of arteriosclerosis, as occurs during senility or decline of life. The carcinoma cannot grow as rapidly. The tumor also will react less powerfully to the rays. The radiosensitiveness of cancer also depends on the structure of the growth. A carcinoma which is very rich in connective tissue is less easily influenced by the rays than one which consists principally of cells.

The indirect or systemic action of the radium rays may result from the splitting up of the cancer cells whereby a cell protein is liberated. This in turn is followed by a leukopenia. In patients in whom we observe a favorable reaction, this negative phase is followed by a leukocytosis and lymphocytosis. Could this fact not be construed as representing an increase in the protective powers of the host and thus explain the observation of Dr. Levin that a cessation of the growth of the tumor occurred, though apparently typical carcinoma cells were found in subsequent examinations?

DR. ALFRED WOELFEL, Chicago: In another section, in which a paper on the effect of radium was discussed, the statement was made that the effect on the pathogenesis depended on the malignancy being in a state of active mitosis, as I understood it; that no effect was to be expected from radium rays unless the cells were in a state of active mitosis or unless use was made of the caustic rays. Dr. Levin, however, explains the irradiation effect as consisting of an interruption of the proliferating power of the cells. I would like Dr. Levin to explain that a little more fully. I gather from his paper that he means that the action of the rays on the pathogenesis is not limited to the time in which the cells are in an actual state of mitosis.

DR. JAMES EWING, New York: I have often observed the condition which Dr. Levin presented and which others also have observed. I do not think, however, that any of us have wanted to commit ourselves to the view that the physical treatment of cancer can rest with the production of this state of suspended animation in cancer tissue. In practically all Roentgen-ray and radium clinics there are patients who are doing fairly well, but who still have obvious signs of the disease and whose tissue shows that the tumor cells are still in an excellent state of nutrition, and sometimes with a mitotic process going on. The



disease is still there but the patient is doing very well. Yet their condition is very unsatisfactory, both to the surgeon and to the Roentgen-ray therapist.

The tendency is to do something more for these people and to attempt to destroy these cells, and the result in most instances is unfortunate. I am inclined to think that in the treatment of inoperable cases of advanced carcinoma by physical agents we shall have to come to the conclusion that all that can be expected is to bring the tumor to the state of suspended activity described by Dr. Levin; and if we can add to the duration of life by 10 per cent. of the present expectation, we shall have accomplished a great deal. It may be that physical therapy will have to leave to other methods the final solution of this problem.

As for the direct and indirect effects of physical agents, that is a matter in which there is a difference of opinion. Until we know a good deal more about the indirect effect of the rays, we had better trust to the direct effects.

DR. ISAAC LEVIN, New York: I need not reply to Dr. Schmitz's question, since Dr. Ewing has answered it. There is no direct proof of the existence of a secondary immunizing effect of the rays on the organism, and for the present we must accept only the direct action of the rays on the malignant tumor. The pathologic and clinical evidences of malignancy do not always coincide. A pathologist cannot decide from the microscopic appearance whether the specimen is derived from an ulcer rodens or an epithelioma of the lip. Clinically, on the other hand, the former is a comparatively benign condition, while epithelioma of the lip belongs to the most malignant types of cancer. The same is true of the case of melanotic cancer described in the paper; the condition surely lost its clinical malignancy since the treatment was initiated. Still the two specimens taken before and after treatment show an identical microscopic picture.

The comparative number of mitotic figures found in a microscopic specimen is also no direct indication of clinical malignancy. There are round cell sarcomas which show under the microscope a great many mitotic figures but which are clinically comparatively benign.

The first action of the rays on the cancer cells consists most probably in the inhibition of their proliferating power without any degeneration and actual destruction of the cell. The latter follows subsequently. It is true at the same time that when this stunning, as it were, of the cancer cell is not followed by its destruction, then it may ultimately recover, and a recurrence of the tumor will take place. The same process probably takes place when the tumor recurs twenty years after a radical operation.

\* \* \* \* \*



**AN ANALYSIS OF FORTY-THREE CASES OF  
SKIN CANCER\***

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University of Minnesota Medical School

MINNEAPOLIS

Much has been said and written on the subject of skin cancer. Hazen<sup>1</sup>, in a recent book, has given an ample presentation of the subject. My reason for presenting this analysis of forty-three cases is that I have found that a lamentable lack of knowledge of the dangers of skin cancer still exists as regards both the general public and the average physician.

I have had patients tell me that their family physician told them to leave these lesions alone and, in other instances, I have seen cancer near the eye burned off with caustics and recurrences take place and destroy the eye and endanger life itself.

At the present time, both the medical journals and the newspapers have done good work in the dissemination of knowledge on this subject. It is only by endless repetition, however, that any medical facts are generally made known to the public, and so the endeavor must go on, even at the risk of being tiresome to some of us who have ample information on the subject.

The problem of prevention of skin cancer is, to my mind, more important than the treatment of the disease after it stands, and I will endeavor to show from the analysis of these few cases that a great many could have been easily prevented. This is something that needs to be emphasized in the medical schools, as I have found patients often very anxious to have skin blemishes removed from fear of cancer, and I have often found that they came of their own volition as their physician had told them that the lesion was of no consequence.

Progress has been made, however, and the outlook for the future is brighter and we all can help by insisting on the eradication of any lesion that we know from our experience to be a precancerous condition.

In an analysis of these forty-three cases, we find that there were twenty-eight males and fifteen females. This is nearly twice as many in the male as in the female. The ages varied from 27 to 86 years; there were two cases under 30, seven cases under 35, eleven under 50, and thirty-two cases above 50 years. The duration of the disease varied all the way from eight weeks to twenty-five years.

They were all located on the face, neck or ear. The extremities were not involved in this series. Most of the cases were around the nose or on the cheeks, the lower eyelid was involved twice, the temple twice, the lower lip four times. Of the lower lip cases, two were due to smoking, one to a cold-sore and one to seborrheic keratosis. We

\* Reprinted from the Jour. A. M. A., Vol. LXIX, 179-180, July 21, 1917.  
Read before the Section on Dermatology at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.  
1. Hazen, H. H.: Skin Cancer, St. Louis, C. V. Mosby, 1916.



# RADIUM

## SYNOPSIS OF FORTY-THREE CASES OF SKIN CANCER.

Case	Sex	Age	Etiology
1	m	81	Started as pimple; was cut and irritated....
2	f	53	Seborrheic keratosis .....
3	m	62	Seborrheic keratosis and had been twice cau- terized with nitrate stick.
4	f	69	Started like a cold-sore and did not heal...
5	m	77	Pimple came on nose after auto accident. Lesion did not heal but grew rapidly and destroyed ala of nose.
6	f	78	Seborrheic keratosis .....
7	m	41	Razor cut. Did not heal.....
8	m	85	Seborrheic keratosis .....
9	f	84	Began as pimple. Operated on twice and recurred. Roentgen-rayed off and on for three years.
10	m	59	Seborrheic keratosis .....
11	m	65	Began from squeezing a blackhead.....
12	m	27	Alkali dust irritated eyes and produced con- junctivitis. Rubbed and irritated and finally began to ulcerate.
13	m	71	Seborrheic keratosis .....
14	f	53	Seborrheic keratosis. ....
15	m	30	Smoked pipe. Had a white spot which later turned into a sore and did not heal.
16	m	57	Began as red spot like dilated blood vessel. Was treated with electric needle, after which it started to grow and formed an ulcer.
17	m	75	Seborrheic keratosis .....
18	m	35	Started from injury. Sore resulted and was irritated by patient. Has been frozen with CO <sub>2</sub> , curetted and Roentgen-rayed Biopsy. Prickle celled.
19	f	32	Started as red spot; then grew and ulcer formed. Was cut and skin grafted. Re- curred. Roentgen rayed for a long time.
20	f	56	Began as red scaly spot; after five years be- gan to ulcerate.
21	m	58	Began as red pimple; later ulcerated. Was burned off a couple of times. Nose glasses irritated it.
22	m	66	Seborrheic keratosis .....
23	m	47	Cut while shaving. Did not heal and ulcer formed.
24	f	66	Began with a scratch.....
25	f	35	Began with a scratch.....
26	m	56	Started from slight injury. Skin cracked and ulcer formed.
27	m	66	Smoked pipe. Had a hyperkeratosis and leukoplakia. Ulcer formed.
28	f	56	Irritation of nose glasses caused sore which failed to heal.
29	f	55	Started from injury. Stick hit patient and ulcer formed.
30	m	41	Started from small pimple.....
31	m	45	Started from wart. Burnt off twice.....
32	m	32	Started from smooth wart or fibroma. Burnt with silver nitrate twice and recurred.
33	m	29	Started from cold-sore. Ulcer did not heal...
34	m	63	Started as small ulcer. May have been seborrheic keratosis.
35	f	74	Started from squeezing a blackhead. A small tumor formed which grew slowly.
36	m	57	Seborrheic keratosis .....
37	m	74	Started from scaly spot; probably seborrheic keratosis.
38	f	53	Started from scratching a scaly spot which itched. Small ulcer formed which gradu- ally spread, growing rapidly last few mos.
39	m	86	Seborrheic keratosis. ....
40	m	58	Started from a wart.....

## SYNOPSIS OF FORTY-THREE CASES OF SKIN CANCER.

Location	Duration	Treatment	Results	Recurrences
Neck under chin	10-12 yrs.	Radium	Good	Yes
Side of nose	12 yrs.	Radium	Cured	No
Side of nose	1 yrs.	Radium	Cured	No
Upper lip	15 mos.	Radium	Cured	No
Ala of nose and 1 cheek	1 yr.	Radium	Cured	No
Large area on 1 cheek	18 yrs.	Radium	Cured	No
Right cheek	18 mos.	Radium	Cured	No
Left malar eminence	Several years.	Radium	Cured	No
Bridge of nose	25 yrs.	Radium	Poor	Yes
Side of nose	1 yr.	Radium	Cured	No
Side of nose	2½ yrs.	Radium	Cured	No
Lower right eyelid	4 yrs.	Radium	Cured	No
Left cheek	Several years.	Radium	Cured	No
Left cheek	2 yrs.	Radium	Cured	No
Lower lip	2 yrs.	Radium	Cured	No
Left cheek	18 mos.	Radium	Cured	No
Left malar area	2 yrs.	Radium	Stimulated lesion	Not absolutely well yet
Median line of nose	15 yrs.	Radium	Good	
Right temple	8 yrs.	Radium	Good	Not absolutely well yet
Nose	20 yrs.	Radium	Cured	No
Nose	5 yrs.	Radium	Cured	No
Left side of cheek	1 yr.	Radium	Cured	No
On cheek in front of r. ear	3 mos.	Radium	Cured	No
End of nose	4 yrs.	Radium	Cured	No
Left nasolabial fold	3 yrs.	Radium	Cured	No
Upper part of left eyelid	10 yrs.	Radium	Cured	No
Lower lip	8 wks.	Radium	Cured	No
Nose near left ear	2 yrs.	Radium	Cured	No
Right lower eyelid and r. cheek	10 yrs.	Radium	Cured	No
Right cheek near eye	2 yrs.	Radium	Cured	No
Right side of nose	3½ yrs.	Radium	Cured	No
Left side of nose	2 yrs.	Radium	Cured	No
Lower lip	1½ yrs.	Radium	Cured	No
Right temple	5 yrs.	Radium	Cured	No
Left cheek near nose	3 yrs.	Radium	Cured	No
Left side of nose and front of ear	6 yrs.	Radium	Under treatment	No
Near canthus of right eye	10 mos.	Radium	Under treatment	
Right cheek and right lower eyelid	20 yrs.	Radium	Cured	No
Left nasolabial fold	6 yrs.	Radium	Cured	No
Upper part right eyelid	10 yrs.	Radium	Cured	No



## SYNOPSIS OF FORTY-THREE CASES OF SKIN CANCER.

41	m	57	Started with squeezing a blackhead; grew slowly; was burned off with silver several times.
42	f	66	Began as scaly spot. Patient has seborrheic keratosis.
43	f	72	Began as scaly spot. Patient has seborrheic keratosis.

all know the malignancy of cancer of the lower lip, but I have found that cases involving the inner canthus of the eye are very hard to cure, and if they involve the orbit, the difficulties of treatment are greatly increased.

## ETIOLOGY

From the frequency of the occurrence of skin cancer on the exposed surfaces of the body, one is led to believe that the rays of the sun may have something to do with its production, or it may be only on account of the better opportunity for irritation to occur.

Fourteen of these forty-three cases were due to seborrheic keratoses.. This is about 30 per cent. and is the most frequent cause in this series.

Acute injury, such as a razor cut, a scratch, or being hit with a stick, was responsible for seven cases, and three cases were directly due to pinching out blackheads with the fingers. This gives ten cases due to one acute injury and is about 25 per cent. of the total. Most writers mention trauma as a cause, the occurrence of repeated slight injuries, but do not emphasize the single injury. I was greatly surprised to find this large percentage on analyzing these cases.

Other causes were warts in three cases, pimples five cases, smoking two cases, both on the lower lip, cold-sore two cases, scaly spot three cases, irritation of nose-glasses one case, irritation of alkali dust one case on lower eyelid, angioma one case, red spot one case. Every one of these cases then was due to either one acute injury or to a precancerous dermatosis or to chronic irritation.

I am certain that in many cases we must have the added factor of chronic irritation. Chronic irritation alone can also cause skin cancer. This has long been known and is shown in this series by two cases involving the lower lip due to smoking, and by the eyelid involvement due to chronic irritation of alkali dust and rubbing.

The high percentage of cases due to an acute injury would lead one to suspect either an infectious origin or a displacement of cells at the time of injury.

In patients with seborrheic keratoses, I think that the formation of skin cancer is possibly aided by the irritation of sunlight, scratching the lesions and picking off the crusts. This might explain the cause of the occurrence of skin cancer in these patients only on the exposed surfaces. We often see seborrheic keratoses on the body, but I never have been a skin cancer on the body caused by it. However, on examining a very small beginning epithelioma due to this cause, I often have been led to believe that the pressure of the heaped-up scales gradually caused enough chronic irritation in the underlying cells to make them undergo cancerous degeneration and form a little ulcer with the characteristic hard edges.

There were seven patients with multiple lesions, and of these six were due to seborrheic keratoses and the other was due to a scaly spot.

## SYNOPSIS OF FORTY-THREE CASES OF SKIN CANCER.

Lower side of nose	10-15 yrs.	Radium	Cured	No
Left side of end of nose	4 yrs.	Radium	Under treatment	
Right cheek near nose	12 yrs.	Radium	Under treatment	

In Cases 1, 13, 17, 20, 22, and 39, more than one lesion was present.

The treatment given in these cases was radium. Thirty-four patients are cured to date; four are still under observation and should result in cures; two were benefited but not well yet; two had recurrences and one patient was directly stimulated. Of the two that recurred, one involved the neck and was previously treated with the Roentgen ray but not entirely healed. This patient has done well under radium, but is not completely cured and, at present, I am trying desiccation on him.

The second patient also received Roentgen treatment, in this instance extending over a period of nearly three years. After one course of radium treatment the patient disappeared for six months, and the disease, which previously was on the bridge of the nose, had spread so that it involved the frontal sinus. This patient had in previous years been operated on twice and the lesion had recurred both times.

The case that was directly stimulated involved the malar bone and the amount of radium used was too small to be effective. It was necessary to resort to surgery and do a wide operation, and Roentgen rays were used afterward. This patient writes me that he is now apparently well. This was a prickle cell tumor.

### CONCLUSIONS

The most important part of the cancer problem is prevention. From this analysis, all but the ten cases due to an acute injury could have been prevented, as thirty-three were due to a precancerous dermatosis or to a chronic irritation. Too much emphasis cannot, therefore, be laid on the early removal of all lesions on the face and hands, especially such as seborrheic keratoses, warts, moles, pimples, angiomas, etc. I assume that the term "pimple," as given by the patients, must have meant some small fibrous tumor. This removal is particularly important for people over 50 years of age, as that is when the majority of these cases begin.

The cases due to injury could not have been prevented, and present a puzzling problem. Skin cancer should be suspected in any ulcer of the face or extremities which does not heal readily under ordinary treatment. If skin cancer exists it should be treated most energetically either by excision, intensive Roentgen ray or radium. Treatment should be instituted early while the lesions are small and before extensive destruction has resulted.

### ABSTRACT OF DISCUSSION.

DR. FRED WISE, New York: In the concluding remarks of his paper, Dr. Sweitzer laid especial stress on the question of prophylaxis in cutaneous cancer. This is a point which is invariably emphasized by all who are interested in the subject, and the physician is ever cautioned to regard with suspicion and stubborn growth of the integument, especially in adults and elderly people. Cautioning physicians is very good as far as it goes, but I think that very little is done in the way



of educating the lay public. The magazine sections of the Sunday papers, instead of dealing with some of the popular minor ailments, such freckles, superfluous hair, etc., would do well to devote some space to teaching the lay public the danger of neglecting persistent pigmented and warty growths of the skin, which show signs of degeneration or proliferation. In the larger cities, the children of high school age should be taught all about the subject of skin cancer. Children between 16 and 20 years are at an age when these lessons would be deeply impressed on their minds, and information of this character would eventually prove to be an exceedingly valuable aid in the prophylaxis of cancer.

DR. EVERETT S. LAIN, Oklahoma, City: Dr. Sweitzer has given a good classification; and as he said, he has repeated that oft-given warning relative to early treatment of skin cancer, and of precancerous condition. I do not think, however, that this can be emphasized too much; nor does any one realize the effect of removal of early lesions more than do dermatologists.

I was interested in the classification, and while there were but forty-one cases, yet that gives a fair degree of knowledge of the usual run of skin cancers.

Dr. Sweitzer's experience corresponds closely with my own in the summary which I made in 1915 of about 250 cases, which perhaps some of you may remember having read in reprints, or in our *Oklahoma State Medical Journal*. This summary of the forty-one cases corresponds with the larger number I gave in 1915, except that I never found epithelioma of the inner canthus of the eye any more stubborn than when located externally. The inner canthus condition is doubtless caused by our attempts to remove dust and other foreign particles from the eye. I find that in this location the lesion yields to the Roentgen ray and radium equally with those located externally.

As regards the age of the patient, we formerly thought it was almost impossible for anyone under 40 years of age to have the epithelial type of cancer. I have a record of three patients under 30, one 22, and another 23, and all typical cases of epithelioma, one near the lower eyelid on one side, and the other on the lower lip. They have yielded to treatment.

One thing most of us have observed (which is rather contradictory to the usual course of other diseases) is that after 65 or 70 all epithelial cancers, in my experience, yield more readily than the same types in person of middle age.

As regards race, we expect in the Irish, who have fair, red, tender skins, epithelioma to be more common than in others. That is also true of fair Germans; a large percentage of my cases have been of the Irish or fair German type. The reverse is also true; dark skinned people, as pointed out by Hazen in the Negro, and the full-blooded Indians, to whom I called attention in my paper in 1913 before this section, are not subject to skin cancers. I have yet to see my first case in an Indian. I have seen but few cancers in the negro.

Dr. Wise thought it would be a good thing to have lectures in the public schools in regard to prevention of skin lesions. This progress, I am pleased to say, has been made in the high school of Oklahoma City. For two years we have had medical lectures before the domestic

science part of the graduating class. Instruction is given on the prevention of skin lesions and the nursing and care which may be given by ordinary measures.

DR. WALTER J. HEIMANN, New York: What evidence is there that cancer may be caused by acute conditions known to us by the name of "cold sores"?

DR. CHARLES J. SHEPARD, Columbus, Ohio: Dr. Sweitzer mentioned epithelioma following smoking. I wish to report a case I saw on the lip of a carpenter, which apparently followed the holding in his mouth of a lead pencil which he used in his work. It was probably covered with dirt, and doing that day in and day out, had apparently produced that result.

DR. J. C. BATESON, Scranton, Pa: The essayist has brought out his ideas in a very simple way. I should like to call attention to the cause, as being attributed to traumatism, or some condition such as a wart or mole. I do not believe that these are primary causes, but furnish suitable locations for development.

It is evident that some steps should be taken to inform the public that all malformations should be looked after carefully by the physician to prevent the development of skin cancer. Not all warts or moles produce cancers, but if they are causing any disturbance I think it advisable to remove them at once. We also know that the public fears the knife and think that warts should be left alone.

Now, as to the quack who uses pastes and local escharotics. I know many of their patients, even after the use of the knife, have been cured; and I, too, have treated like cases with simple escharotics, such as acetic acid, zinc chlorid or some combination, and have brought about beautiful results. If we know how to use escharotics with tact and skill, we need not relegate them to the quack.

DR. FREDERICK HARRIS, Chicago: The best way to destroy cancer that I know of is by means of a red hot soldering iron. This will do away with the cancer; so will arsenic, zinc chlorid and trichloroacetic acid; but as dermatologists we have better methods than these of treating cancer of the skin.

DR. HAROLD N. COLE, Cleveland: I concur in the suggestions, but I think the Association should be very careful about recommending anything of that sort.

DR. JOHN E. LANE, New Haven, Conn: The treatments recommended by the speaker, excision, Roentgen ray and radium, are all that are to be recommended in the treatment of cancer, and for ordinary use excision should have the preference. In selected cases in proper hands, radium and the Roentgen ray are most valuable, but as used by a great many operators—I agree with a well-known dermatologist that "there are more crimes committed in the name of the Roentgen ray than ever were committed in the name of liberty." One of the most frequent reasons given for using the Roentgen ray for the removal of a cancer is that the cancer is small. To my mind that is no indication for not using the knife. At the age at which most skin cancers appear, a small one can be cut out, leaving a scar that in a few weeks can hardly be distinguished from a wrinkle. It is done more quickly, more surely and with less expense to the patient than in any other way, and if properly done the cosmetic results are as good. In some locations



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the Roentgen ray or radium is the method of choice. As far as escharotics, acids and other methods of that sort are concerned, I believe that the time has long since gone by to mention them even for condemnation. Certainly it is past my comprehension how any physician can mention them for any other reason than total condemnation. They have no place at all in medicine of the present day.

DR. LOUIS B. MOUNT, Albany, N. Y.: One case I recall, that of a prickle-cell epithelioma of the lower lip in a man 26 years old. Six years previously, that is, at the age of 20, he was in a fight and was struck on the lower lip. From that time on he had a small bluish discoloration there, which was exactly the spot on which the epithelioma developed. I disagree with the last speaker's statement that the cosmetic results of surgery are better than those obtained with radium or the Roentgen ray.

DR. JAMES M. KING, Nashville, Tenn.: I had one patient who began to develop an epithelioma in the right ear at the age of 16, confirmed with the microscope. When I saw the patient he was 19 years of age, and the growth covered nearly the entire ear. Later he developed a lesion of the nose and one on the chin; That was at the age of 21 or 22.

In reference to the point of cancer resulting from a traumatism, I had one case resulting from a wasp's sting in a mole. When I saw the patient the lesion was about the size of a quarter. It was evidently a cancer. I treated the patient with the Roentgen ray and it gave as good a result as I could wish. Another case was in a patient who cut his lip while eating an apple; death followed from cancer starting in the wound after two or three years' treatment.

In reference to treatment of cancer, I think the main point to keep in mind is the pathology of the case and the size of the lesion. In the case of a small lesion I would treat with the Roentgen ray. I would be sure of getting a better cosmetic result with that, and as permanent a result as by any other means. If it were a larger growth, I would use my judgment as to whether excision and Roentgen ray or Roentgen ray alone was better treatment. I do not advocate pastes. Excision with the electrocautery is a means which I prefer above all others, followed by the Roentgen ray in massive doses.

DR. HENRY W. HAZEN, Washington, D. C.: I want to touch a few high spots concerning cancer. First, we must differentiate between prickle-cell and basal-cell cancer. Prickle-cell cancer usually invades the neighboring lymph nodes, and the problem is the same as in cancer of the breast. Now, if one gets a patient early, before a clinical diagnosis is possible, and uses the Roentgen ray or caustic, one cannot tell whether one is dealing with prickle-cell or basal-cell cancer. It is always necessary to know, for that gives the clew to treatment. Diagnosis in the case of prickle-cell cancer must be made early. In dealing with cancer of the lip, if the glands are definitely involved at the time of operation we know that the patient does not have the chance for life that he has before they are clinically involved. The glands should be cleaned out before they show any change.

As to treatment, let me give a few statistics: Last winter I studied about 150 of Dr. Bloodgood's cases of basal-cell cancer. Of the cases which could be traced up for the requisite number of years, 86 or 87 per cent. of patients who could be operated on, were definitely cured.

Dr. McKee, in an excellent paper read in Cincinnati last month, found that the Roentgen ray cured nearly the same percentage of cases in a series of about the same size; so we have some justification for the claim that the Roentgen ray is good. Of course we must remember that the Roentgen-ray work was done by an extremely skillful radiologist, and also that the surgery was done by very competent surgeons. I personally believe, as Dr. Lane said, that there are many crimes committed in the name of Roentgen ray. I think many people use radium who do not know anything about it. I have had cases in which the growth was simply stimulated by it, instead of destroyed; and I fear lest some men, using radium in too small quantities, do more harm than good.

As far as caustics are concerned, I do not see how any man with regard for the feelings of his patients will use caustics in preference to the Roentgen ray. No patient will ever elect the second use of caustic paste unless he be a candidate for martyrdom. Of all caustics the use of the actual cautery, with either a local or general anesthetic, is the only one really fit for use. It gives many cures, and the cosmetic results are not as bad as many think.

DR. C. AUGUSTUS SIMPSON, Washington, D. C.: I agree with the other speakers that the use of small amounts of radium may not destroy, but simply stimulate, the growth of skin cancers. I also would like to apply the same statements to many of the Roentgen-ray equipments used by dermatologists. I am sorry to say that I find many known dermatologists treating skin cancers with the cheap, little Roentgen-ray machines that do just as much harm and just as little good as an insufficient amount of radium. It is just as unreasonable and harmful to attempt to cure these lesions with a weak and inferior outfit as it is to attempt the same end with \$300 or \$400 worth of radium. In both instances the growth is more often stimulated than destroyed.

In regard to prickle-cell carcinoma, I will repeat what we have known for some years. Dr. Pusey's statistics relating to this lesion when located on the upper lip show that they are as amenable to Roentgen-ray therapy as basal-cell carcinoma. Naturally, if the glands are involved it is a case for surgery, to be followed by the Roentgen ray.

I do not think it is necessary to do a biopsy on every case of skin cancer by any means. If a microscopic examination seems necessary, remove the entire growth and then section it. We must remember it is a cure the patient seeks and pays for, and not statistics and a diagnosis. A biopsy and Roentgen-ray treatment on the same lesion seem to me to be inconsistent.

DR. SAMUEL E. SWEITZER, Minneapolis: I do not know the etiology of skin cancer—I should have said, the etiologic factors. Concerning the question of acute injury, I should say that of these patients, one gave the history of having been chopping wood, when a stick flew up and hit her, an ulcer formed and an epithelioma on the upper lid resulted. The sister of another woman gave her a little scratch; there was no defect there previously. I saw her within two months and she had an epithelioma on the side of the nose. In the case of a man with an eruption on the lower lip, he said it was a cold sore. After the cold sore had disappeared the lip did not heal and he had an epithelioma. I simply brought that out in the history taking. The only one I saw was in the case of a business man who, while shaving himself, made one



single cut near the ear. He came to me in a few weeks with a tiny epithelioma with hard edges. Precancerous dermatosis is something which I think should be removed before the lesion starts, if possible.

In giving my treatment I said: First exision, then Roentgen ray, and then radium. I used the radium but I do not insist on others doing it. These lesions were all on the face and ears, in places which would show the results of the therapy. I am sure excision would leave more scar than I got by the means I used. I have had a number of patients who have had recurrences after excision. I agree with Dr. Hazen that it is preferable to excise in the prickle-cell cases and treat with radium afterwards. It must be borne in mind that the treatment varies in different hands.

## REVIEWS AND ABSTRACTS

THOMAS S. CULLEN, M. B., F. A. C. S. (Baltimore). *America's Place in the Surgery of the World. Surgery, Gynecology and Obstetrics, XXV, No. 4, Oct., 1917, pp. 376-390.* With regard to the relations of radium and surgery the writer says:

*"Radium.* The use of radium is still in its infancy. You and I know little or nothing about it, but fortunately a few of the physicians in America have enough to try it out and to find what may be accomplished by its use. At the present time I think all are agreed that whenever a case is operable the growth should be removed with the knife, and that radium should be employed afterward in suitable cases."

"In our surgically inoperable cases we know that every patient must eventually die of the disease. If the radium expert treats all these he will undoubtedly lose a large percentage. Some of us are prone to call these failures, but this is hardly fair. We should ask what percentage of success he has been able to attain where we have absolutely failed. If he cures ten in one hundred of those we have sent away as inoperable and left to die, he has accomplished a great deal although he may have been able to do little or nothing for the remaining ninety. Some of our inoperable cases can be cured at least clinically; others can be temporarily relieved of their pain and discharge."

"We as a nation should be thankful that we have enthusiastic members of the profession who are not willing to spend a great deal of money but also devote most of their time in attempting to relieve a group of cases that are beyond surgical aid. I cannot refrain from briefly mentioning a case that came under my care in March of this year."

"A woman, 52 years of age, was admitted to the Church Home and Infirmary, Baltimore, with a supposed uterine myoma. On examination I found a globular tumor filling the pelvis and extending to the umbilicus. The glands in both groins were enlarged and nodular. In both axillae were nodules. In the right axilla was a nodule about 4 centimeters in diameter. A few days later numerous small shot-like or pea-like nodules could be felt along the legs and arms. I hesitated for a long time and finally decided to do nothing. The family was so insistent that I eventually consented to explore the abdomen. The pelvis was filled with a large mass, globular and so fixed that the pelvic organs

could not be outlined. Occupying the right side of the abdomen and firmly adherent to the large pelvic tumor was a second tumor about 12 centimeters in diameter; many omental vessels ran directly into it. The omentum was studded with small oval nodules having sharp edges. I removed some of the omentum and closed the abdomen."

"Microscopical examination of the omental nodules showed lymphosarcoma, and I told the family that nothing further could be done. The patient had a quaint little girl of four who was wrapped up in her mother, and I could not get away from the thought of the tragedy in store for the child. Grasping at a straw I rang up my friend Burnam, gave him the details of the case and asked him if anything could be done. He said he would try, and he did. The patient was given applications of radium at twenty-one different points, extending over a period of eleven hours. She was greatly shocked, but gradually recovered. I examined this patient a few days ago. There was absolutely no trace of the abdominal or pelvic growth, and I could outline with the utmost ease the pelvic structures which seemed to be perfectly normal. The inguinal regions were normal. No tumors were palpable in the axillae, and all of the small nodules had disappeared from the legs and arms. Her only complaint was a slight diarrhoea."

"It may be that the growths will return, but that remains to be seen. They are not there now, and if the patient remains well say for a year, how much do you think that means to her little daughter and to the family?"

"At the present time we know of at least three good things radium has done.

1. It has apparently cured a percentage of surgically inoperable cancer and sarcoma cases.
2. It has prolonged life in others.
3. It has relieved the pain and done away with or mitigated distressing discharges in not a few. In other words, it has done enough to make us feel that we would want to have it tried on any member of our family that had an inoperable growth."

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Arthur Fenwick Holding, M. D. and William Bayard Long, M. D. (New York), *The Truth About Radioactive Therapy in Malignant Growth*. Jour. A. M. A., LXIX, pp. 982-4, Sept. 22, 1917. Read before the Section on Pharmacology and Therapeutics at the Sixty-Eighth Annual Session of the American Medical Association, New York, June, 1917.

"With the advent of the radioactive methods some twenty years ago (Roentgen ray, 1895, and radium, 1905), it was natural that enthusiastic advocates of these methods should claim more for them than they actually were able to accomplish. At least, that has been the history of all new therapeutic procedures. Once again the surgeon looked on in his properly critical attitude and decided that they would not do. "Into the discard with them." But this time his judgement was probably a little premature, although correct from his particular angle. With the exception of basal cell epitheliomas and certain growths with the morphology of sarcomas, but with a low grade of virulence, we doubt that radioactive measures per se ever cure malignant tumors, except in the most infrequent instances; and surgery is still the proper method to which we must resort."



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"In making this statement we have in mind patients who, treated by surgery and by Roentgen rays or radium, have relapsed after being symptomatically cured for ten, thirteen and even seventeen years, and also those occasional cases of spontaneous cures which occur in the practice of every surgeon of wide experience. The surgeon's attitude of mind is induced, no doubt, by having to pass judgement on so many worthless and widely advertised "cures". But still we think the orthodox surgical attitude is somewhat faulty. Might it not have been better for the surgeon to say, "These things do not cure cancer, consequently it is better to operate when we can. But perhaps there is something to radioactive measures after all, and possibly they may prove to be the very thing I need to help me prevent recurrence after the main mass is removed or to help ameliorate the condition of the poor afflicted individual with inoperable growth, for whom my surgical skill can do nothing."

"Such an attitude has been the exception, not the rule, with the result that progress has been slow. Workers with the Roentgen ray and radium have by no means been exempt from criticism as regards the reports of their work. On the other hand, many sincere and honest workers in this field have had their results pointed at with a finger of scorn and disbelief with the result that a spirit of antagonism has developed in the very place where it should be conspicuously absent. Fortunately, in the last few years, a better spirit has prevailed. Surgeon and radiotherapist stand side by side and compare results, laboratories are being equipped with proper apparatus for experimental work, an occasional hospital equips its operating room with such apparatus, and altogether a spirit of toleration and conservatism prevails which leads up to hope that whatever, of truth there is will be speedily demonstrated."

"We offer the following as a summery of our beliefs regarding the application of radiotherapy in malignant growths:

"1. All operable tumors, basal cell epitheliomas excepted, should be treated surgically at the earliest possible moment, but all such cases should receive the benefit of preoperative and postoperative raying with radium or the Roentgen ray or both. Furthermore, no case of operable tumor has had the benefit of all that can be done unless such procedure is followed; and the surgical statistics will materially improve if this be done."

"2. All instances of inoperable tumors, of whatever nature, should be given the benefit of radiotherapy. For, while in the present state of our knowledge we cannot hold out any great promise of cure, we certainly can do more with this method to relieve these poor sufferers from pain, fetid odor, discharge, etc., than in any other way, and we can prolong life over a period varying from months to years."

"3. We feel urged to suggest to hospital authorities in general, and medical boards in particular, a more enlightened attitude toward radiotherapy. Radium is expensive, we know, but the Roentgen ray, compared to the good it does, is a very inexpensive therapeutic measure."

"4. We desire to urge that the many laboratories devoted to cancer research be equipped with men and apparatus in order that the many still unsolved problems of radiotherapy may be solved, as well as possible advance made in therapeutic technic."



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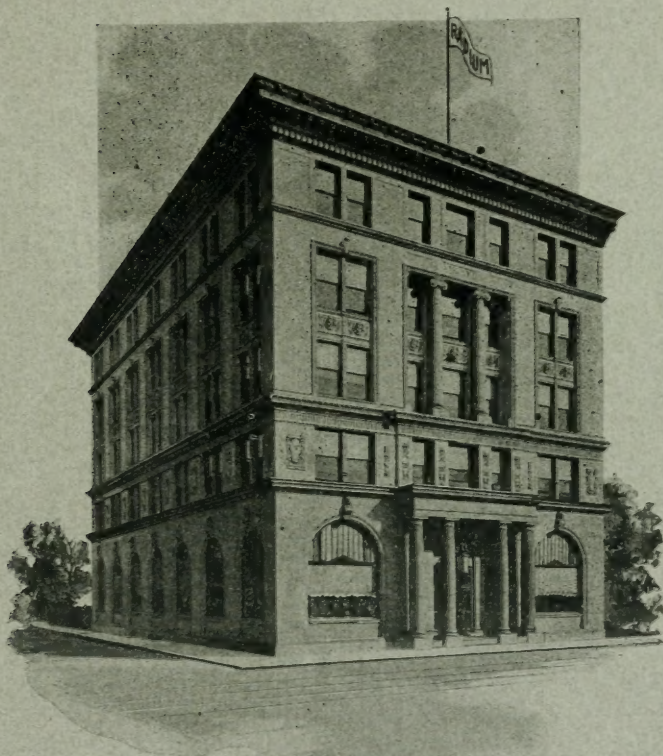
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